

**Balancing Strategies**1. *Hydrocarbon Combustion Reactions.*

Make sure Hydrogens in  $C_xH_y$  are divisible by 4. If not, add the lowest coefficient possible so that they are.

2. *Odd/Even Combination.*

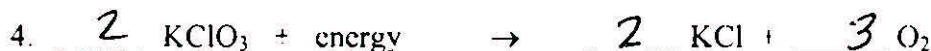
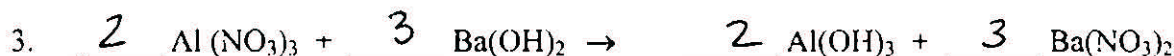
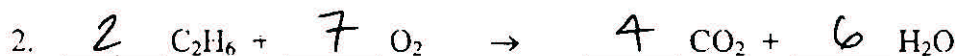
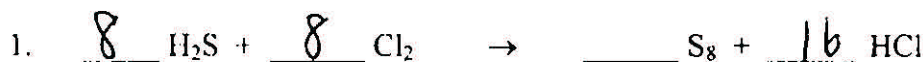
Make the subscript of the Odd the coefficient of the even and vice versa.

3. *Balance Groups as Groups.*

If a polyatomic group in a compound exists on both sides of the equation, balance the group instead of individual element.

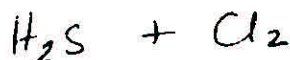
4. *The  $H_2O$  Split.*

If H and OH appear on one side of an equation and  $H_2O$  appears on the other, separate  $H_2O$  into  $H(OH)$

**I. Balance the following equations:**

Is equation # 4 an endothermic (absorption of energy) or an exothermic (release of energy) reaction? (circle one)

List the reactants in reaction #1 (not individual atoms)

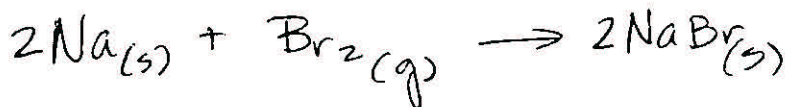


**II. Write and balance the follow word equations. \*\*\*Be sure to note the physical state of each reactant and product\*\*\***

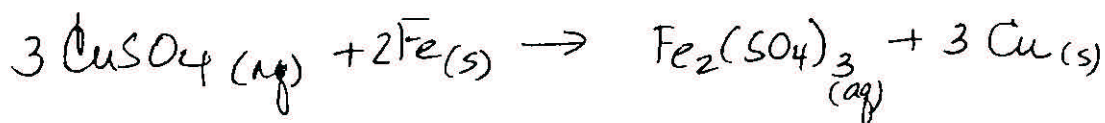
*Strategies for writing equations*

1. Use your ion table to form reactant and product ionic compounds.
2. Covalent compounds (ex.  $\text{CO}_2$ ) are written according to their prefixes)
3. Metals stand alone. They have no subscripts. Other than mercury (Hg) they are all solid
4. Most nonmetals (Br, I, N, Cl, H, O, F) by themselves are diatomic (have a subscript of 2). Iodine is a solid and Bromine is a liquid. All others are gases.

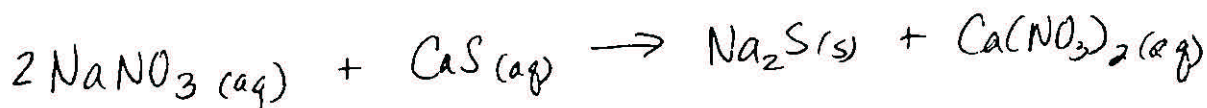
1. Sodium metal combines with bromine gas to form solid sodium bromide



2. Aqueous copper (II) sulfate reacts with solid Iron to produce aqueous Iron (III) sulfate and solid copper.



3. Aqueous sodium nitrate combines with aqueous calcium sulfide to form solid sodium sulfide and aqueous calcium nitrate.



**III. Identify the physical state of each of the following compounds as solid (s) or aqueous (aq)**

*Strategies:*

*All ionic compounds are either aqueous or solid at room temperature. A substance that will dissolve is soluble (if water is around) and is therefore aqueous. A substance that is insoluble will not dissolve and is therefore remains a solid in the presence of water.*

*Use the solubility table and make sure to check for exceptions.*

(s) AgCl

(s)  $\text{Pb}(\text{SO}_4)_2$

(aq)  $\text{K}_2\text{S}$

(aq)  $(\text{NH}_4)_2\text{S}$

(aq) Aluminum Nitrate

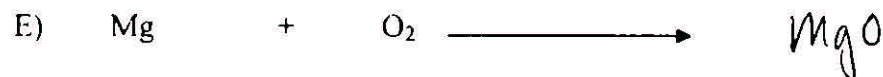
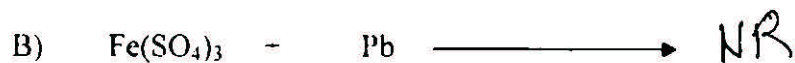
(s) Calcium Carbonate

(s) <sup>(li)</sup>Lead Iodide

on the product side of the reaction.

**Strategies:**

1. Use the activity series to determine if a single replacement reaction will occur. Identify the two elements that would compete with each other in the activity series. If the lone element is higher on the activity series, then the reaction will occur. If it is lower, the reaction will not occur.
2. In a double replacement reaction two aqueous solutions will produce either water or a solid. If both products are aqueous, then the reaction does not take place.
3. When predicting products of any reaction, do not pay attention to the subscripts of the reactants. Form the compounds using your ion tables for ionic compounds and keep in mind that metals by themselves will have no subscripts. Use BrINClHOF for non-metals.



**V. Name the types of equations in A-E**

You must know the general formulas for the 5 different reactions without the use of the sheet that I gave you

A) DR

B) SR

C) Combustion

D) Decomposition